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(57) Abstract

A method for providing support for a computer system includes receiving at a first help desk application program (130) information (146, 246, 346, 446) associated with a customer (170, 180, 270, 280, 370, 380, 470, 480) concerning a problem with the computer system that is experienced by the customer. The method further includes storing the information in a first database (140, 240, 340, 440) and conditionally replicating portions of the information to a second database (140, 240, 340, 440) that is accessible by a second help desk application program (140, 240, 340, 440).
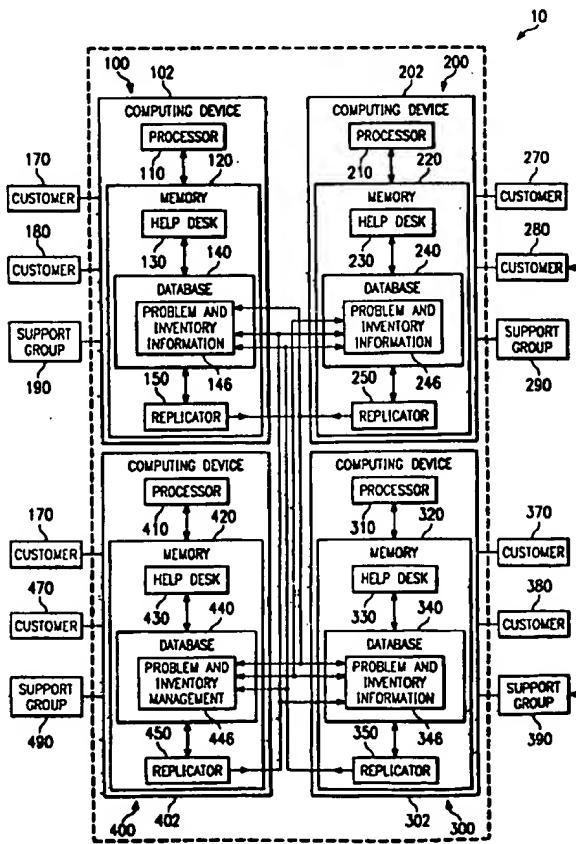
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DISTRIBUTED HELP DESK SYSTEM AND METHOD

TECHNICAL FIELD OF THE INVENTION

This invention relates generally to the field of
help desks and more particularly to a distributed help
desk system and method.

BACKGROUND OF THE INVENTION

Computer systems have become pervasive in today's
society. Although computer systems may provide many
advantages that make work easier, computer system
often require maintenance. To assist in maintaining a
computer system, a help desk system is often employed.
A help desk system often manages assignment of tasks
related to solving various problems that may be
experienced by a computer system. One example of a
help desk system is ServiceCenter, available from
Peregrine Systems, Inc.

Help desk systems may incorporate recent
technological advances to operate in a quick and
productive way. For example, help desks systems
conventionally use graphical user interface features
such as windows, pull-down menus, buttons, bitmaps,
and scroll bars to facilitate entry of a problem by
reducing the number of keystrokes necessary for
problem entry. Although the use of graphical user
interface features provides some advantages, the use
of a graphical user interface also leads to several
disadvantages, particularly in the context of a multi-
user help desk system. Such a system requires a large
amount of network bandwidth in order to provide good
response times between a client using a graphical user
interface, which

conventionally runs on a personal computer, and the help
desk system.

As a result, a fast network infrastructure is
necessary to fully realize the benefits associated with a
help desk system. Therefore, the operating range of a
help desk system utilizing a graphical user interface
toolkit is conventionally limited in size. Generally such
help desk systems are limited to an office, a building, or
a campus environment.

A business environment, however, is not necessarily
limited to one building, one country, or one geographical
area. As a result, multiple help desk systems, each at a
separate physical location, may need to cooperate in order
to support larger business environments.

Therefore, information associated with the problem to
be solved and the status of that problem may need to be
exchanged between multiple help desk systems. Information
about the customer, the supported environment, and the
history of the problems are valuable and facilitate fast
and effective support. In addition, information relating
to the infrastructure of the computer system to which a
help desk system provides support is useful in supporting
the problem management process. Such information may
include an inventory of infrastructure items like routers,
lines, servers, PC's, software, and other infrastructure
items suitable for use in a computer network. Although
this inventory information may be present to support a
single, isolated help desk system, it loses its support
value if the problem is sent to another help desk system
that no longer has access to this inventory information.

Although access to inventory information, information
associated with the problem to be solved, the status of
that problem, and additional support information is useful,
this information is not conventionally automatically
available to isolated help desks. Therefore, assignment,
escalation, reporting, and status tracking are either
difficult or impossible for customer problems that extend
beyond the operating area of a single help desk system,
rendering difficult the support of a customer located in
numerous locations.

SUMMARY OF THE INVENTION

Therefore, a need has arisen for a distributed help desk system and method that addresses the disadvantages and deficiencies of prior techniques. The invention comprises a distributed help desk system and method.

According to one aspect of the invention, a method for providing support for a computer system includes receiving at a first help desk application program information associated with a customer concerning a problem with the computer system that is experienced by the customer. The method further includes storing the information in a first database and conditionally replicating portions of the information to a second database that is accessible by a second help desk application program.

According to another embodiment of the invention, a distributed help desk system includes a first computing system comprising a first processor and a first memory system. A first help desk application program is stored in the first memory system and is executable by the first processor. The system also includes a first database accessible by the first help desk application program. The first database is operable to store data for use by the first help desk application program. The system also includes a second computing system comprising a second processor and a second memory system. The system also includes a second help desk application stored in the second memory system and executable by the second processor. A second database in the system is accessible by the second help desk application program and is operable to store data for use by the second help desk application

program.   The system also includes a data replicator
operable to replicate selected portions of any data stored
in the first database to the second database for access by
the second help desk application program.

5   The invention provides numerous technical advantages.
For example, the invention allows help desk operators to
have access to problem and inventory information through
user friendly screens that facilitate their work by
providing information with limited keystrokes, yet also
10   allows them to be more effective in resolving problems in
a timely fashion due to the availability of good support
information, history, and reference material. Each
individual help desk can operate quickly since all data
access is to local storage, and it can operate autonomously
15   since there is no dependency on external connections.
However, it can still operate as part of a bigger support
organization because relevant information is made available
to all appropriate help desks within the system.

           As soon as problem or inventory information is entered
20   in one location, it is replicated automatically to all
other relevant help desk sites from which that information
can be viewed or updated. Updates to this information from
any help desk site are replicated to all other relevant
help desk sites.   Therefore, problem and inventory
25   information is maintained locally at each help desk site
but each copy of that data is kept synchronized with the
other copies. The invention therefore provides help desks
with the relevant information necessary to support the
problem solving process, even when the information was
30   entered at another location. In addition, the invention

allows data transfer between separate help desks over slower communication lines such as lines in a wide-area network, yet still allows the use of graphical user interfaces.

Multiple help desks can therefore exist to handle organizational, cultural, and lingual differences, but they can also cooperate to solve a problem because they each have access to the required information. Assignment to support groups, status tracking of problems, and reporting is therefore not bound to the traditional boundaries of isolated help desks.

BRIEF DESCRIPTION OF THE DRAWINGS

For a more complete understanding of the present invention and the advantages thereof, reference is now made to the following descriptions taken in connection with the accompanying drawings in which:

FIGURE 1 is a block diagram of one embodiment of a distributed help desk system according to the teachings of the present invention;

FIGURE 2 is a block diagram illustrating one representation of information stored in a database in the distributed help desk system illustrated in FIGURE 1;

FIGURE 3 is a block diagram illustrating portions of the information illustrated in FIGURE 2, showing additional details of that information;

FIGURE 4 is a table illustrating the replication of data stored in various databases in the distributed help desk system illustrated in FIGURE 1; and

FIGURE 5 is a flow chart illustrating example steps associated with the operation of the distributed help desk system illustrated in FIGURE 1.

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DETAILED DESCRIPTION OF THE INVENTION

An embodiment of the present invention and its advantages are best understood by referring to FIGURE 1 through 5 of the drawings, like numerals being used for

5   like and corresponding parts of the various drawings.

FIGURE 1 is a block diagram of one embodiment of a distributed help desk system 10 according to the teachings of the present invention. Distributed help desk system 10 allows multiple help desks at different locations to access

10   information useful in solving a problem that is initially received at one of those help desks. In one embodiment, a distributed help desk system 10 includes locations 100, 200, 300, and 400. Locations 100, 200, 300, and 400 include a computing device 102, 202, 302, and 402,

15   respectively. Computing devices 102, 202, 302, and 402 may be substantially similar.

Computing device 102 preferably includes a processor 110 and a memory 120 accessible by the processor 110. Memory 120 may comprise both random access memory as well

20   as disk storage or other types of storage. Memory 120 preferably stores a help desk application program 130, a database 140 associated with the help desk application program 130, and a database replicator 150 associated with the database 140. In one embodiment, help desk application

25   program 130 is a ServiceCenter help desk application program available from Peregrine Systems, Inc.; however, any suitable help desk application program may be used. In the same embodiment, database 140 is an INGRES database, and database replicator 150 is an INGRES database

replicator; however, other suitable brands and types of databases and replicators may be used.

Help desk application program 130 may function to manage assignment of tasks related to solving problems that
may be experienced by a computer system. In one embodiment, help desk application program 130 provides functions related to problem management and inventory management. Problem management functions may include opening a problem record, updating a problem record, and
closing a problem record. Example steps that may be associated with inventory management include adding inventory items and locating inventory items.

Database 140 may store various types of information used by help desk application program 130 in processing a
problem. Database 140 may receive this information from help desk application program 130 or, as described in greater detail below, from other computing devices located within distributed help desk system 10.

Problem and Inventory Information 146 is one type of
information stored in database 140. In one embodiment, Problem and Inventory Information 146 includes two primary categories of information: problem information and inventory information. Problem information includes information associated with a specific problem experienced
by a customer. Inventory information includes technical information relating to the systems that are being managed. Problem information may be received from a customer for each problem experienced. Inventory information may be maintained in database 140, but is not necessarily updated
by a customer for each problem experienced. Examples of

Problem and Inventory Information used by help desk application program 130 are discussed in greater detail below in conjunction with FIGURES 2 and 3.

5   Replicator 150 replicates certain data stored within database 140 to selected other databases within distributed help desk system 10 for use by other help desk application programs that are associated with those databases. By replication of certain data from one database, such as database 140, to other databases, such as databases 240,

10   340, and 440, a plurality of help desk application programs can be involved in solving a problem entered at only one location.

          Processors 210, 310, and 410 may be substantially similar to processor 110. Memory 220, 320, and 420 may be

15   substantially similar to memory 120. Help desk application programs 230, 330, and 430 may be substantially similar to help desk application program 130. Databases 240, 340, and 440 and Problem and Inventory Information 246, 346, and 446 may be substantially similar to database 140.

20   Replicators 250, 350, and 450 may be substantially similar to replicator 150.

          In one embodiment, each location 100, 200, 300, and 400 is associated with a plurality of customers. If a location and a customer are associated, information related

25   to a problem experienced by a customer may be provided to the help desk application program stored at that location for handling. For each location 100, 200, 300, and 400, information may be provided to the help desk application stored within the location through the use of a workstation

30   or a personal computer (not explicitly shown) connected to

the computing device at that location. Such workstations or personal computers may incorporate graphical user interfaces, which conventionally require communication pathways having a large bandwidth.

In the embodiment illustrated in FIGURE 1, customers 170 and 180 are associated with location 100; customers 270 and 280 are associated with location 200; customers 370 and 380 are associated with location 300; and customers 170 and 470 are associated with location 400. As shown, a customer may be associated with more than one location. Thus, for the embodiment illustrated in FIGURE 1, information relating to a problem experienced by customer 170 may be provided to either help desk application program 130 at location 100 or help desk application program 430 at location 400. As used herein, a "customer" includes any distinct entity for which separate identification is desired, and is not limited to separate companies. For example, a division of a company may be a customer even though the company itself is also a customer.

Each location is also associated with a support group. A support group may be one or more personnel that handle solving of problems provided to a help desk application program. If a support group and a location are associated, the support group may handle solving of any problems entered into the help desk application program stored within that location. In FIGURE 1, a support group 190 is associated with location 100, a support group 290 is associated with location 200, a support group 390 is associated with location 300, and a support group 490 is associated with location 400. Thus, in this example,

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support group 190 handles problems entered into help desk application program 130, support group 290 handles problems entered into help desk application program 230, support group 390 handles problems entered into help desk application program 330, and support group 490 handles problems entered into help desk application program 430. Support group 290 is discussed in greater detail below in conjunction with FIGURE 4.

A customer and a support group may also be associated. If a customer and a support group are associated, the support group may handle problems initially provided by that customer to any help desk application, rather than only problems provided to a help desk application at a location associated with the support group. The support groups with which a customer is associated may be defined for each customer. In the embodiment illustrated in FIGURE 1, customer 280 and support group 390 are associated. Thus support group 390 may handle problems for customer 280 even though information relating to customer 280 may be originally entered only into help desk application program 230, which is at location 200. Customers 170, 180, 270, 370, 380, and 470 are not associated with any support groups; however, support group 290 may handle problems related to these customers for reasons discussed in conjunction with FIGURE 4.

According to the invention, replicators 150, 250, 350, and 450 replicate selected portions of Problem and Inventory Information 146, 246, 346, and 446 stored in databases 140, 240, 340, and 440, respectively. Through replication, information necessary to support the problem

solving process is available to each help desk application
program involved in the problem solving process, even when
the information originated at a different location. For
example, and as illustrated in FIGURE 1, each replicator

5   preferably is operable to replicate data to each of the
other databases contained within distributed help desk
system 10. However, to where data is replicated is
determined by several factors discussed below in
conjunction with FIGURE 4. Those factors relate to whether

10   the help desk application program located at a particular
location requires access to the replicated data.

FIGURE 2 is a block diagram illustrating one
representation of Problem and Inventory Information 146
stored within database 140.· Problem and Inventory

15   Information 146 stored within database 140 may be
illustrated, as shown in FIGURE 2, as a collection of
records 147, each storing Problem and Inventory Information
146 files related to a particular problem. Records 147
include a first record 148 associated with a first problem.

20   However, although each record 147 is related to a
particular problem, each record 147 may contain both
information that is specific to the particular problem for
which the record exists and also information that applies
to all records 147. Problem and Inventory Information 246,

25   346, and 446 may be analogous to Problem and Inventory
Information 146.

Examples of files containing problem management
information in an embodiment of the invention utilizing
Peregrine's ServiceCenter help desk application for help

30   desk application program 130 are illustrated in FIGURE 3;

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however, other suitable files may be used to store problem management information, and these particular files may be omitted in favor of others. Problem management information may contain information associated with a specific problem
5   experienced by a customer. Example files include a Problem file 712, a Problem Summary file 714, a Mail file 716, a Schedule file 780, a Number file 778, a Customer file 722, an Assignment file 720, a Probable Cause file 802, and a Category file 718.

10   Problem file 712 includes a history of a problem. Each action upon a problem is registered in Problem file 712 using a sequence number. Problem Summary file 714 includes an overview of a problem. Schedule file 780 includes events that are scheduled for execution, such as
15   alerts and mails. Mail file 716 receives any mails issued based upon the handling of a problem. Number file 778 is used to generate the next problem number for assignment to the next problem received by help desk application program 130. Number file 778 is used to generate a problem
20   identification number associated with a problem. Number file 778 is not replicated because synchronously updating a central number for use by all locations 100, 200, 300 and 400 would destroy local autonomy. However, asynchronously replicating Number file 778 could result in separate
25   problems having the same problem identification number. To alleviate this concern, each help desk application program 130, 230, 330 and 430 is preferably assigned a range of problem identification numbers for assignment to problems received at that location, thus avoiding any potential
30   conflict in numbering.

Customer file 722 includes information indicating for which customer the problem is reported. Assignment file 720 includes information indicating the support group to which the problem is assigned. Probable Cause file 802 includes information indicating the probable cause of the problem. Category file 718 includes information indicating the type of problem.

Additional files that are related to problem management may include a Priority file 724, a Severity file 726, an Operator Profile file 776, a Problem Management Group Profile file 796, a Problem Management Environment file 798, a Location file 766, a Contact file 770, a Model file 772, a Software1 file 774, a Format file 792, a Format Control file 794, a Validity Table file 806, a Link Table file 804, and a Stored Query file 800.

Examples of inventory information are also illustrated in FIGURE 3; however, other suitable files may be used to store inventory information and these particular files may be omitted in favor of others. Inventory information may contain technical information relating to the systems that are being managed. Example files include Device file 728, Vendor file 768, Bridge file 730, Circuit file 732, Port file 734, Controller file 736, CPU file 738, FEP file 740, Modem file 742, Lines file 744, Peripherals file 746, PC file 748, Printer file 750, Server file 752, Switch file 754, Workstation file 756, Terminal file 758, Voice file 760, RUPC file 762, RULine file 764, and RUController file 765. Because access to technical information relating to the systems that are being managed facilitates the problem solving process, access to these

files is useful for the problem solving process.
Additional files that may be utilized in one embodiment of
the invention include System Log file 784, Message Log file
786, Menu file 788, and Capabilities file 790.

5   FIGURE 3 is a block diagram illustrating portions of
record 148, illustrated in FIGURE 2, showing additional
details of the contents of record 148. As described above,
problem record 148 includes a plurality of files containing
information that may be required by help desk application
10   program 130 for solving the problem for which record 148
was generated. This information may be divided into three
categories: a customer specific data 810, a global data
820, and a local data 830. The category assigned a data
file determines, in part, to where a data file may be
15   replicated.

           Customer specific data 810 is data that is related to
a particular customer. In one embodiment, all customer
specific data files include a field having a customer code
identifying the customer to which the customer specific
20   data file applies. This customer code is generated for
each customer specific file when a problem is provided to
a help desk application program. The customer code that is
provided is based on the customer that experienced the
problem requiring assistance. Replication of customer
25   specific data 810 is based on the customer code assigned to
the customer data files.

           Global data 820 is data that is not necessarily
related to a particular customer. Replication of global
data files is discussed below. Local data 830 is data that

is maintained locally at the location where it was entered. Local data 830 is not replicated.

According to the invention, portions of Problem and Inventory Information 146, 246, 346, and 446 are replicated by replicator 150 to other computing devices within distributed help desk system 10. To which computing devices portions of Problem and Inventory Information 146 is to be replicated is determined both by the type of location 200, 300, and 400, and the category of information.

As discussed above, distributed help desk system 10 includes four locations 100, 200, 300, and 400. According to the invention, each of these locations is a specific type of location. Location 200 is a central location. In one embodiment, all customer specific data 810 and global data 820 are replicated to central locations regardless of which customers are associated with the central location.

Location 300 is a support group location. A support group location includes a support group that may handle problem solving for customers that are not associated with that location. For example, location 300 is a support group location because support group 390 may handle problem solving for customer 280 and because customer 280 is not associated with location 300. Because central location 200 is associated with support group 290, support group 290 may handle problems for all customers; however, central location 200 is not classified as a support group location.

A third type of location is a standard location. A standard location is a location that is not a central

location or a support group location. Locations 100 and
400 are standard locations.

According to the invention, for each problem, all
customer specific data 810 having a field with a customer
5   code designating a given customer is replicated to
locations with which that customer is associated. In
addition, all customer specific data 810 having a field
with a customer code designating a given customer is
replicated to all support group locations associated with
10   support groups that are associated with that customer. In
addition, all customer specific data 810 is replicated to
all central locations. For each problem, global data, such
as global data 820, is replicated to all locations within
the distributed help desk system 10. Local data, such as
15   local data 830, is not replicated.

The replication of data from one location to another
location within distributed help desk system 10 may be
illustrated with reference to FIGURE 4. FIGURE 4 is a table
illustrating the replication of data from one location
20   within distributed help desk system 10 to another. Eight
example cases of replication are illustrated.

Referring to the first line of data in FIGURE 4, data
provided to help desk application program 130 at
location 100 on behalf of customer 170 for a given problem
25   is replicated as follows. Customer specific data, such as
customer specific data 810, is replicated to location 200
because location 200 is a central location. Customer
specific data 810 is also replicated to location 400
because location 400 is a support group location having a
30   support group with which customer 170 is associated.

Global data, such as global data 820, is replicated to locations 200, 300, and 400. Local data is preferably not replicated.

Referring now to the second line of data in FIGURE 4, data provided to help desk application program 130 at location 100 on behalf of customer 180 for a given problem is replicated as follows. Customer specific data, such as data analogous to customer specific data 810, is replicated to location 200 because location 200 is a central location. Customer specific data 810 is not replicated to locations 300 and 400. Global data, such as data analogous to global data 820, is replicated to locations 200, 300, and 400. Local data, such as data analogous to local data 830, is preferably not replicated.

Referring now to the third line of data in FIGURE 4, data provided to help desk application program 230 at location 200 on behalf of customer 270 for a given problem is replicated as follows. Customer specific data, such as data analogous to customer specific data 810, is not replicated to locations 100, 300, and 400 because these locations are not central locations. They are not associated with customer 270, and they are not associated with a support group that is associated with customer 270. Global data, such as data analogous to global data 820, is replicated to locations 100, 300, and 400. Local data, such as data analogous to local data 830, is preferably not replicated.

Referring now to the fourth line of data in FIGURE 4, data provided to help desk application program 230 at location 200 on behalf of customer 280 for a given problem

is replicated as follows. Customer specific data, such as data analogous to customer specific data 810, is replicated to location 300 because location 300 is associated with support group 390, which is associated with customer 280. Global data, such as data analogous to global data 820, is replicated to locations 100, 300, and 400. Local data, such as data analogous to local data 830, is preferably not replicated.

Referring now to the fifth line of data in FIGURE 4, data provided to help desk application program 330 at location 300 on behalf of customer 370 for a given problem is replicated as follows. Customer specific data, such as data analogous to customer specific data 810, is replicated to location 200 because location 200 is a central location. Customer specific data is not replicated to locations 100 and 400. Global data, such data analogous to global data 820, is replicated to locations 100, 200, and 400. Local data, such as data analogous to local data 830, is preferably not replicated.

Referring now to the sixth line of data in FIGURE 4, data provided to help desk application program 330 at location 300 on behalf of customer 380 for a given problem is replicated as follows. Customer specific data, such as data analogous to customer specific data 810, is replicated to location 200 because location 200 is a central location. Customer specific data is not replicated to locations 100 and 400. Global data, such data analogous to global data 820, is preferably replicated to locations 100, 200, and 400. Local data, such as data analogous to local data 830, is preferably not replicated.

Referring now to the seventh line of data in FIGURE 4, data provided to help desk application program 430 at location 400 on behalf of customer 470 for a given problem is replicated as follows. Customer specific data, such as data analogous to customer specific data 810, is replicated to location 200 because location 200 is a central location. Customer specific data is not replicated to locations 100 and 300. Global data, such data analogous to global data 820, is replicated to locations 100, 200, and 300. Local data, such as data analogous to local data 830, is preferably not replicated.

Referring now to the eighth line of data in FIGURE 4, data provided to help desk application program 430 at location 400 on behalf of customer 480 for a given problem is replicated as follows. Customer specific data, such as data analogous to customer specific data 810, is replicated to location 100 because location 100 is associated with customer 170. Customer specific data is also replicated to location 200 because location 200 is a central location. Customer specific data is not replicated to locations 300 and 400. Global data, such as data analogous to global data 820, is replicated to locations 100, 200, and 300. Local data, such as data analogous to local data 830, is not replicated.

Thus, through replication, data required by help desk application programs 130, 230, 330, and 430 is accessible by those applications in order to handle processing of problem entered at remote locations.

FIGURE 5 is a flow chart illustrating steps associated with the operation of distributed help desk system 10.

With reference to FIGURE 1 through 5, and particularly FIGURE 5, the operation of distributed help desk system 10 is described.

Operation of distributed help desk system 10 begins at step 900. At step 910 a problem record is opened for a particular customer. Opening a problem record may include receiving information on the behalf of a customer describing the problem experienced by the customer. Once a problem record is opened, at step 920 portions of the data associated with the problem are replicated as described above. This replication provides information required by help desk application programs stored at remote locations to participate in the problem solving process.

At step 930, the problem record is updated. A problem record may be updated by receiving information related to a change in status of the problem. According to the invention, a problem record may be updated at the location the problem information was originally received, or it may be updated at any location that has access to the data associated with the problem. If step 910 is associated with opening a problem record for customer 170, step 930 of updating a problem record may occur through reception of information at locations 100, 200 or 400. Locations 200 and 400 may update a problem associated with customer 170 that was initially received at location 100 because customer specific data 810 is replicated to locations 200 and 400.

Once a problem record has been updated, at step 940 portions of the data associated with the problem are replicated as described above. If step 930 of updating the problem record included receiving information at location

400, customer specific data 810 is replicated to locations
100 and 200 because location 100 is associated with
customer 170 and location 200 is a central location. If
step 930 of updating the problem record includes receiving
5   information at location 200, customer specific data 810 is
replicated to the locations associated with customer 170,
which are locations 100 and 400.

At step 950, a problem record is closed. Upon closing
a problem record, step 960 of replicating appropriate data
10   to appropriate locations is executed. In this example, if
step 950 of closing a problem record includes receiving
information at location 400, customer specific data 810 is
replicated to location 100 because location 100 is
associated with customer 170 and to location 200 because
15   location 200 is a central location. The operation of
distributed help desk system 10 ends at step 970.

Thus, distributed help desk system 10 allows multiple
help desk application programs and support personnel
associated with these help desk application programs to be
20   involved in the problem solving process, while maintaining
the ability of each help desk application program to
communicate with operators through the use of a graphical
user interface, which conventionally requires a large band
width.

25   Although the invention has been particularly shown and
described by the foregoing detailed description, it will be
understood by those skilled in the art that various changes
in form and detail may be made without departing from the
spirit and scope of the invention.

WHAT IS CLAIMED IS:

1.   A distributed help desk system comprising:

a first computing system comprising a first processor and a first memory system;

5   a first help desk application program stored in the first memory system and executable by the first processor;

a first database accessible by the first help desk application program, the first database operable to store data for use by the first help desk application;

10   a second computing system comprising a second processor and a second memory system;

a second help desk application program stored in the second memory system and executable by the second processor;

15   a second database accessible by the second help desk application program, the second database operable to store data for use by the second help desk application program; and

a data replicator operable to replicate selected

20   portions of any data stored in the first database to the second database for access by the second help desk application program.

2.   The distributed help desk system of Claim 1

25   wherein the first help desk application program comprises a ServiceCenter application.

3.   The distributed help desk system of Claim 1 wherein the data replicator is an Ingres replicator.

30

4.   The distributed help desk system of Claim 1 wherein:

the first database is further operable to store data associated with a first customer; and

the data replicator is further operable to conditionally replicate to the second database, based on the first customer, portions of any data associated with the first customer that are stored in the first database.

5.   The distributed help desk system of Claim 1 wherein:

the first database is further operable to store data associated with a customer code that is associated with a first customer; and

the data replicator is further operable to conditionally replicate to the second database, based on the customer code, portions of any data associated with the customer code that is associated with the first customer that are stored in the first database.

6.   The distributed help desk system of Claim 1 wherein the replicator is a replicator application program stored in the first memory system.

7.   The distributed help desk system of Claim 1 wherein the replicator is an Ingres replicator.

8.   A distributed help desk system comprising:

a plurality of locations, each location comprising a computing system, each computing system comprising:

a help desk application program;

a database accessible by the help desk application program; and

a data replicator operable to access the database; and

wherein at least one of the data replicators is further operable to replicate data to at least one of the databases.

9.   The distributed help desk system of Claim 8 wherein each data replicator is further operable to replicate data to at least one of the databases.

10.   The distributed help desk system of Claim 8 wherein the plurality of locations comprises at least three locations and wherein each data replicator in each location is further operable to replicate data to a plurality of the databases.

11.   The distributed help desk system of Claim 9 wherein each database stores data having a customer code and wherein each data replicator is further operable to conditionally replicate data, based on the customer code, to at least one database.

12.   The distributed help desk system of Claim 8 wherein the plurality of locations comprise locations having a category and wherein each data replicator is further operable to conditionally replicate data to at

least one database based on the category of location in which at least one database is stored.

13. The distributed help desk system of Claim 11 wherein the plurality of locations comprise a central location and a support group location and wherein each data replicator is further operable to:

replicate data to all support group locations based on the customer code; and

replicate data to all central locations.

14. The distributed help desk of Claim 8 wherein each help desk application program is operable to assign a problem number associated with portions of any data stored in the respective database accessible by the help desk application program, the problem number selected from a range of numbers unique to the help desk application program.

15. A method of providing support for a computer system, the method comprising the steps of:

receiving at a first help desk application program information associated with a customer concerning a problem with the computer system that is experienced by the customer;

storing the information in a first database; and

replicating portions of the information to a second database that is accessible by a second help desk application program.

16. The method of Claim 15 wherein the step of replicating portions of the information comprises the step of conditionally replicating portions of the information based on the customer with which the information is associated.

17. The method of Claim 15 wherein the second database is stored at a location and the step of replicating portions of the information comprises the step of conditionally replicating portions of the information based on the type of location.

18. The method of Claim 15 and further comprising the step of receiving the portions of the information at the second help desk application program from the second database.

19. The method of Claim 15 and further comprising the step of accessing the portions of the information at the second help desk application.

20. The method of Claim 19 and further comprising the steps of:

    receiving information associated with the customer at the second help desk application program;

    storing the information in the second database; and

    replicating portions of the information to the first database.

FIG. 1

10

100   102
CUSTOMER 170
CUSTOMER 180
SUPPORT GROUP 190

COMPUTING DEVICE

PROCESSOR
110   120

MEMORY
130   140

HELP DESK

DATABASE
150   146

PROBLEM AND INVENTORY INFORMATION

REPLICATOR

---

202   200

COMPUTING DEVICE

PROCESSOR
210   220

MEMORY
230   240

HELP DESK

DATABASE
250   246

PROBLEM AND INVENTORY INFORMATION

REPLICATOR

CUSTOMER 270
CUSTOMER 280
SUPPORT GROUP 290

CUSTOMER 170
CUSTOMER 470
SUPPORT GROUP 490

COMPUTING DEVICE

PROCESSOR
410   420

MEMORY
430   440

HELP DESK

DATABASE
450   446

PROBLEM AND INVENTORY MANAGEMENT

REPLICATOR

400   402

COMPUTING DEVICE

PROCESSOR
310   320

MEMORY
330   340

HELP DESK

DATABASE
350   346

PROBLEM AND INVENTORY INFORMATION

REPLICATOR

302   300

CUSTOMER 370
CUSTOMER 380
SUPPORT GROUP 390

FIG. 2

PROBLEM AND INVENTORY INFORMATION

147

Nth PROBLEM:

THIRD PROBLEM:

SECOND PROBLEM:

FIRST PROBLEM:

148

146

FIG. 5

START — 900

OPEN PROBLEM RECORD — 910

REPLICATE DATA TO APPROPRIATE LOCATIONS — 920

UPDATE PROBLEM RECORD — 930

REPLICATE DATA TO APPROPRIATE LOCATIONS — 940

CLOSE PROBLEM RECORD — 950

REPLICATE DATA TO APPROPRIATE LOCATIONS — 960

STOP — 970

FIG. 4

CASE	PROBLEM ENTRY LOCATION OR PROBLEM UPDATE LOCATION	CUSTOMER	CUSTOMER SPECIFIC DATA (810) REPLICATED TO LOCATION	GLOBAL DATA (820) REPLICATED TO LOCATION	LOCAL DATA (830) REPLICATED TO LOCATION
1	100	170	200,400	200,300,400	NONE
2	100	180	200	200,300,400	NONE
3	200	270	NONE	100,300,400	NONE
4	200	280	300	100,300,400	NONE
5	300	370	200	100,200,400	NONE
6	300	380	200	100,200,400	NONE
7	400	470	200	100,200,300	NONE
8	400	170	100,200	100,200,300	NONE

FIG. 3

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CUSTOMER SPECIFIC DATA 810

712	714	716	718
PROBLEM	PROBLEM SUMMARY	MAIL	CATEGORY
720	722	724	726
ASSIGNMENT	CUSTOMER	PRIORITY	SEVERITY
728	730	732	734
DEVICE	BRIDGE	CIRCUIT	PORT
736	738	740	742
CONTROLLER	CPU	FEP	MODEM
744	746	748	750
LINES	PERIPHERALS	PC	PRINTER
752	754	756	758
SERVER	SWITCH	WORKSTATION	TERMINALS
760	762	764	765
VOICE	RUPC	RULINE	RU CONTROLLER

GLOBAL DATA 820

766	768	770	772	774
LOCATION	VENDOR	CONTACT	MODEL	SOFTWARE 1

LOCAL DATA 830

776	778	780	782
OPERATOR PROFILE	NUMBER	SCHEDULE	DEVICE TYPE
784	786	788	790
SYSTEM LOG	MESSAGE LOG	MENU	CAPABILITIES
792	794	796	798
FORMAT	FORMAT CENTRAL	PM GROUP PROFILE	PM ENVIRONMENT
800	802	804	806
STORED QUERY	PROBABLE CAUSE	LINK	VALIDITY TABLE

INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6   G06F9/44

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6   G06F   H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 673 135 A (BRITISH TELECOMM) 20 September 1995 see column 5, line 48 - column 8, line 24; figures 1-3 ---	1-3, 6-10, 15-20
A	US 5 361 361 A (HICKMAN D ANNE ET AL) 1 November 1994 see abstract; figure 3 see column 4, line 20 - line 51 ---	1,2,8, 15,16, 18,19
A	WO 96 08102 A (BRITISH TELECOMM) 14 March 1996 see page 8, line 3 - page 9, line 3; figure 1 -----	1,8,15

☐ Further documents are listed in the continuation of box C.   ☒ Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the International filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
7 August 1998	13/08/1998

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In' tional Application No
PCT/US 98/09517

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			EP	0780042 A	25-06-1997
			US	5640505 A	17-06-1997

1/3

FIC. 1

10

FIG. 2

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